

Innovative Technology Transfer Partnership (ITTP)



Success Story

SOLENOID HEALTH MONITORING FOR AUTOMOTIVE TRANSMISSIONS

Description of Innovation

The Current Signature Sensor is an instrument that non-invasively measures and analyzes steady-state and transient components of the magnetic field of (and, thus, indirectly, the electric current in) a solenoid valve during normal operation. The instrument was developed to enable continuous monitoring of integrity and operational status of solenoid valves without need for interrupting operation to conduct frequent inspections. The instrument warns of imminent solenoid-valve failures so that preventive-repairs can be performed. The current-signature sensor exploits the fact that unique characteristics (signatures) of the solenoid current - especially of the turn-on and turn-off current transitions - are affected by electrical and mechanical deterioration of the solenoid and valve parts.)

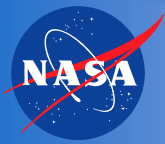


<http://www.schaffertest.com>

The "smart" Current Signature Sensor was designed to handle the abundant solenoid valve usage at KSC and the subsequent maintenance and cost issues related to them. The Current Signature Sensor offers a self-contained, non-invasive smart sensor for valve health monitoring and failure prediction that identifies specific solenoid valve problems, including impeded or jammed poppet travel, burned or shorted windings, faulty springs, friction build up, failure of anti-arcing circuitry, and incorrect operating voltage, temperature, or pressure; automatically corrects output errors due to environmental temperature changes, and notifies a technician when out-of-specification conditions are detected.

Commercial Benefits

The Current Signature Sensor is a value-added feature to end users whose operations include control valve functions. Solenoid valve manufacturers can use this technology to enhance their product and service portfolios. Potential commercial uses include: aircraft and aerospace systems that provide emergency power switching to detect near failure critical solenoids; emergency power equipment in nuclear power plants, airport control towers, hospitals, and large data centers that require smart monitoring; and quality control of flight-critical aerospace components manufactured for end users.



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ITTP Role

A Nonexclusive Patent License Agreement was signed with Schaffer Test Products, Inc. of Lakeland, Florida for the commercialization of the Current Signature Sensor. Schaffer Test Products, Inc. (www.schaffertest.com) designs, manufactures, and sells automotive electronic testing equipment with specialization in transmission testers and controllers, solenoid testers, meters and accessories, and electronic repair products.

Schaffer Test Products learned of the Current Signature sensor through an ITTP directed marketing effort conducted by the Southeast Regional Technology Transfer Center at Georgia Institute of Technology. Once Schaffer Test Products was identified as a potential licensee, Brian Sauser, ASRC Aerospace, assisted them in learning more about the technology and preparing their license application. In addition, Bradley Burns, ASRC Aerospace, provided further testing with ITTP funds to verify that the Current Signature Sensor would work with Schaffer's test equipment.

Larry Schaffer, President, stated, "For the past 11 years, Schaffer Test Products has produced the most durable, effective and affordable products within the industry." When asked about the impact of this technology on the automotive transmission industry, Larry Schaffer said, "This technology has the potential to test automotive solenoids without being invasive. Currently, there is an excessive practice of 'throwing parts (solenoids) at the problem,' with only marginal success. This diagnostic advantage will allow testing of the solenoids via the external connector and with a greater degree of accuracy than anything currently available, even our own successful equipment."

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